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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/039,940	10/26/2001	Bowie G. Keefer	6454-56839	8442
7590 11/26/2004				
KLARQUIST SPARKMAN, LLP One World Trade Center Suite 1600 121 S.W. Salmon Street Portland, OR 97204			EXAMINER KALAFUT, STEPHEN J	
			ART UNIT 1745	PAPER NUMBER

DATE MAILED: 11/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/039,940

Applicant(s) *S.C.*

KEEFER ET AL.

Examiner

Stephen J. Kalafut

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 7/2/2004 and 7/22/2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6, 7, 12-22, 24-33 and 35-95 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-4, 6, 7, 12-22, 24-33, 35-72 and 80-95 is/are allowed.
- 6) ☒ Claim(s) 73-79 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7/2 and 22/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 7/2/2004 has been entered.

The indicated allowability of claims 73-79 is withdrawn in view of the newly discovered reference(s) to Edlund (US 6,667,128) and Ding *et al.* (cited by applicants). Rejections based on the newly cited reference(s) follow.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 73-76, 78 and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edlund (US 6,667,128) in view of Ding *et al.* ("Adsorption-enhanced...", cited by applicants).

Edlund discloses several varieties of fuel cells (column 5, lines 44-45), and teach that fuel cells generally consume hydrogen as a fuel (column 1, lines 18-21), and that hydrogen may be provided from a reforming reaction via a pressure swing adsorption device, which separates the hydrogen from other gases (column 8, lines 48-65). The present claims differ by reciting that an

adsorption bed and a reforming catalyst are in the same module, in two respective zones thereof. Ding *et al.* disclose a system for reforming methane into hydrogen, in which the reforming catalyst may be mixed with the adsorbent throughout the reactor (page 3931, left column), or in which a catalyst-only zone is separate from a mixed catalyst-adsorbent zone (page 3936, right column). The preferred adsorbent is hydrotalcite, the same as at present, which would thus have the same properties, such as preferring CO<sub>2</sub> to water. Because the use of an adsorbent would enhance the reforming reaction (Abstract), and because this arrangement would allow the reformer and adsorber to be housed in a single vessel, it would be obvious to use the reforming adsorbing device of Ding *et al.* to supply hydrogen to the fuel cell of Edlund, such as the solid oxide fuel cell. Selection of an appropriate reforming catalyst would be within the skill of the ordinary artisan, who is given guidance by Ding *et al.* (page 3936, right column, bottom).

Claim 77 is rejected under 35 U.S.C. 103(a) as being unpatentable over Edlund in view of Ding *et al.* as applied to claim 75 above, and further in view of Fornof *et al.* (US 6,358,300).

The above combination does not teach a desiccant in the reforming-adsorbing device, in a third zone thereof. Fornof *et al.* disclose the use of desiccant in pressure swing adsorption, to dry air or other gas (column 2, lines 4-21). Because water is a reactant used to reform hydrocarbons to produce hydrogen for fuel cell use, it may be present residually in the reformer output, which would be detrimental in solid oxide and molten carbonate cells, since it is not a reactant therein. For this reason, it would be obvious to add the desiccant of Fornof *et al.* to the reforming-adsorbing device of Ding *et al.*

Claims 1-4, 6, 7, 12-22, 24-33 35-72 and 80-95, for reasons of record, are allowed. The newly submitted prior art, and the art cited herein, also do not disclose or teach the subject matter indicated as allowable in paper no. 7, pages 5 and 6, except as indicated above.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. An English translation of Japanese 05-166,528 (cited by applicants) is enclosed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is 571-272-1286. The examiner can normally be reached on Mon-Fri 8:00 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sjk



STEPHEN KALAFUT  
PRIMARY EXAMINER  
GROUP

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